

## **REMARKS**

The Examiner is thanked for her careful consideration of the present application, but it is respectfully submitted that the claim rejections are in error and must be withdrawn.

### **Section 102 Rejection**

In response to the 102(b) rejection, based on the STN abstract of Masuda et al. (JP 44-018898), the applicant files concurrently with this response, an Information Disclosure Statement that includes a full translation of the reference.

From the full translation, it is apparent that while Masuda discloses the catalytic hydrogenation of maltodextrin, the reference neither teaches nor suggests the catalytic hydrogenation of malto-oligosaccharides under hydrogenation conditions suitable to substantially preserve the DP 1-8 profile of the mixture. Although some conditions similar to those employed in conjunction with the present invention are said to be employed in connection with the reference, the reference fails to appreciate that the combination of conditions should be selected together so as to substantially preserve the DP 1-8 profile of the starting material.

The examiner notes that the text of the abstract indicates that the maltodextrin is hydrogenated using an activated nickel catalyst at 50-125° C with a pH of 8 and a pressure of 110 kg/cm<sup>2</sup> (1564 psi). However, as is evident from Tables 2 and 3 in the reference, the DP profile is not preserved. The tables in Masuda show a substantial increase in DP 1 species and hence a substantial change in DP profile. Simply put, the reference does not teach that one should substantially preserve DP profile, nor does the reference provide means in which to do so. A skilled artisan, contemplating the reference, even in light of the conditions said to be taught therein, would be lead to believe that it is not possible to preserve DP profile, in light of the marked degradation of DP profile that is set forth therein.

In summary, the reference teaches a set of conditions wherein DP profile was degraded, and provides no teaching that DP profile should be preserved. Nor does the

reference provide any teachings as to how one might preserve DP profile. The invention, which specifies catalytic hydrogenation under conditions suitable to substantially preserve DP 1-8 profile, cannot follow from the teachings of the reference. Withdrawal of the rejection is solicited.

### **Section 103 Rejections**

The Examiner rejects the application as obvious, citing Masuda, in combination with Chao, US 4,322,569 and separately with Borden, U.S. 5,601,863.

Applicants note that the Borden and Chao references were of record in the parent application, and were considered by two Examiners, Messrs. Owen and Wilson, before allowing that application.

As noted above, Masuda fails to teach or suggest the catalytic hydrogenation of malto-oligosaccharides under hydrogenation conditions suitable to substantially preserve the DP 1-8 profile of the mixture. The Examiner cites Chao for the disclosure of the fixed bed process, as well as its pH range and reaction pressures. However, the combination of Masuda and Chao still does not teach the hydrogenation conditions suitable to substantially preserve the DP 1-8 profile of the mixture. The invention, which specifies catalytic hydrogenation under conditions suitable to substantially preserve DP 1-8 profile, cannot be seen to follow for the teachings of the combination of references.

Chao does not support the rejection even when considered in combination with Masuda. Chao teaches the preparation of sorbitol from monosaccharides such as glucose, but teaches nothing about the hydrogenation of a molecule of larger molecular weight. In Chao, glucose is already hydrolyzed to DP 1 and cannot be hydrolyzed further, so preservation of DP profile is not a relevant concept for Chao. Chao does not teach or suggest that the disclosed subject matter may be applied to a maltodextrin of higher molecular weight and still preserve DP profile. When Chao is combined with Masuda, it would have been suggested to one of skill in the art that DP profile would, in fact, degrade. Withdrawal of the rejection based on Masuda in view of Chao is solicited.

Nor does the Borden patent support a Section 103 rejection. As an initial matter, the Office Action asserts that the basic  $\alpha$  1-4 structure of maltodextrin is identical to the polymaltose and polydextrose of Borden. Polydextrose, polymaltose, and maltodextrins

are chemically distinct. Polydextrose, a carbohydrate that is more stable than maltodextrin, is a species linked predominantly by 1-6 linkages. Similarly, polymaltose has a significant proportion of non 1-4 linkages.

Neither Masuda, nor the combination of Masuda and Chao, teach or suggest the catalytic hydrogenation of malto-oligosaccharides under hydrogenation conditions suitable to substantially preserve the DP 1-8 profile of the mixture. Likewise, the addition of Borden does not teach or suggest the invention.

The Examiner points to column 3, lines 42 to the end of column 4 and the examples of Borden as a teaching the use of a variety of metal catalysts, including Raney nickel, for the hydrogenation of polydextrose and polymaltose. Borden does not disclose a method involving malto-oligosaccharides. Borden teaches that the “dextrose or maltose suitable as raw materials” can be obtained from a variety of sources, such as hydrolysis of glucose polymers. But in fact the dextrose and maltose are said to be used by Borden for “polymerization to form polydextrose or polymaltose.” The “raw materials” taught by Borden at column 3 are not catalytically hydrogenated; rather, in all cases, polymaltose or polydextrose is hydrogenated.

The Borden reference is silent as to maltodextrins or any other hydrogenated substrate except for a polymaltose or polydextrose. There is no teaching or suggestion in Borden to apply the teachings set forth therein to malto-oligosaccharides or any other chemical species.

Moreover, even if it could be said that Borden did provide such motivation, there is no teaching in Borden that any of the conditions set forth therein would actually work in connection with malto-oligosaccharides. In this respect, there are differences in stability between maltodextrins and the chemicals disclosed by Borden. There is simply no suggestion that the catalytic hydrogenation disclosed by Borden would be at all suitable for malto-oligosaccharides.

Perhaps more fundamentally, however, Masuda teaches away from the invention. Thus, even if one skilled in the art would have chosen to combine the references in the manner suggested by the Examiner (despite the lack of such motivation), the combined references, considered together, teach away from the present invention.

**Conclusion**

For these reasons, allowance is respectfully solicited.

Respectfully submitted,

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